AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

Claim 1 (previously presented): A riser reactor configured for a fluidized catalytic conversion process including hydrocarbon cracking reactions on hydrocarbons wherein the riser reactor has a riser reactor height and comprises a reactor bottom and further comprises in order from the reactor bottom:

a.) a prelift zone having a prelift zone diameter and a prelift zone height and containing catalytic cracking catalyst, and is further adapted to lift said catalytic cracking catalyst to a first reaction zone without cracking hydrocarbons in the prelift zone,

b.) a first reaction zone having a substantially constant first reaction zone diameter and a first reaction zone height and containing said catalytic cracking catalyst and is adapted to accept said pre-lifted catalytic cracking catalyst from the prelift zone and to react a hydrocarbon in the first reaction zone, wherein the ratio of the first reaction zone diameter to said prelift zone diameter is from about 1:1 to about 2:1 and the height of said first reaction zone is from about 10% to about 30% of the height of the riser reactor,

c.) a second reaction zone having a second reaction zone height and a second reaction zone diameter that is larger than the first reaction zone diameter and containing said catalytic cracking catalyst, and is adapted to accept said catalytic cracking catalyst and reacted hydrocarbons from the first reaction zone, and wherein the ratio of said second reaction zone diameter to said first reaction zone diameter is in the range of from about 1.5:1 to about 5:1 and the height of said second reaction zone is in the range of from about 30% to about 60% of the height of the riser reactor, and

d.) an optional outlet zone having an outlet zone diameter that is reduced with respect to the second reaction zone diameter.

Claim 2 (previously presented): The riser reactor of claim 1 wherein the total height of said prelift zone, said first reaction zone, said second reaction zone, and said optional outlet zone is in the range of from about 10 meters to about 60 meters.

Claim 3 (previously presented): The riser reactor of claim 1 wherein the diameter of said prelift zone is in the range of from about 0.02 meters to about 5 meters and the prelift zone height is in the range of from about 5% to about 10% of the height of the riser reactor.

Claims 4-5 (canceled)

Claim 6 (previously presented): The riser reactor of claim 1 comprising said optional outlet zone and wherein the ratio of said outlet zone diameter to said first reaction zone diameter is in the range of from about 0.8:1 to about 1.5:1 and the height of said outlet zone is up to about 20% of the height of the riser reactor.

Claim 7 (previously presented): The riser reactor of claim 1 further comprising a first junction section between said first reaction zone and said second reaction zone, and wherein said first junction section has a circular truncated cone shape with a vertical section vertex angle with respect to the reactor axis in the range of about 30°~80°.

Claim 8 (previously presented): The riser reactor of claim 1 comprising said optional outlet zone and further comprising a second junction section between said second reaction zone and said outlet zone, and wherein said second junction section has a circular truncated cone shape with a vertical section vertex angle with respect to the reactor axis in the range of about 45°~85°.

Claim 9 (previously presented): A riser reactor configured for a fluidized catalytic conversion process including hydrocarbon conversion reactions on hydrocarbons flowing through at least one reaction zone to produce converted hydrocarbons, the reactor having a substantially vertical linear axis, a riser reactor height, and a reactor bottom, and wherein the riser reactor comprises in order from the reactor bottom:

a.) a prelift zone having a prelift zone diameter and a prelift zone height,

b.) a first reaction zone having a first reaction zone diameter and a first reaction zone height wherein the ratio of the first reaction zone diameter to said prelift zone diameter is from about 1:1 to about 2:1 and the height of said first reaction zone is from about 10% to about 30% of the height of the riser reactor and wherein the first reaction zone is configured so that a hydrocarbon cracking reaction taking place in the first reaction zone takes place at higher reaction temperatures, higher ratios of catalyst to oil, and shorter reaction times than, respectively, a reaction temperature, ratio of catalyst to oil, and reaction time in a second reaction zone,

c.) said second reaction zone having a second reaction zone height and a second reaction zone diameter that is larger than the first reaction zone diameter and wherein the ratio of said second reaction zone diameter to said first reaction zone diameter is in the range of from about 1.5:1 to about 5:1 and the height of said second reaction zone is in the range of from about 30% to about 60% of the height of the riser reactor and wherein said second reaction zone is configured so that a hydrocarbon conversion reaction taking place in the second reaction zone takes place at lower reaction temperature, lower ratio of catalyst to oil, and longer reaction time than, respectively, the reaction temperature, ratio of catalyst to oil, and reaction time in the first reaction zone, and

d.) an optional outlet zone having an outlet zone diameter that is reduced with respect to the second reaction zone diameter.

Claim 10 (previously presented): The riser reactor of claim 9 wherein the total height of said prelift zone, said first reaction zone, said second reaction zone, and said optional outlet zone is in the range of from about 10 meters to about 60 meters.

Claim 11 (previously presented): The riser reactor of claim 9 wherein the diameter of said prelift zone is in the range of from about 0.02 meters to about 5 meters and the prelift zone height is in the range of from about 5% to about 10% of the height of the riser reactor.

Claims 12-13 (canceled)

Claim 14 (previously presented): The riser reactor of claim 9 comprising said optional outlet zone and wherein the ratio of said outlet zone diameter to said first reaction zone diameter is in the range of from about 0.8:1 to about 1.5:1 and the height of said outlet zone is up to about 20% of the height of the riser reactor.

Claim 15 (previously presented): The riser reactor of claim 9 further comprising a first junction section between said first reaction zone and said second reaction zone, and wherein said first junction section has a circular truncated cone shape with a vertical section vertex angle with respect to the reactor axis in the range of about 30°~80°.

Claim 16 (previously presented): The riser reactor of claim 9 comprising said optional outlet zone and further comprising a second junction section between said second reaction zone and said outlet zone, and wherein said second junction section has a circular truncated cone shape with a vertical section vertex angle with respect to the reactor axis in the range of about 45°~85°.

Claim 17 (previously presented): A riser reactor configured for a fluidized catalytic conversion process to produce converted hydrocarbons, the reactor having a substantially vertical linear axis, a riser reactor height, and a reactor bottom, and wherein the riser reactor comprises in order from the reactor bottom:

a.) a prelift zone having a prelift zone diameter and a prelift zone height,

b.) a first reaction zone having a first reaction zone diameter and a first reaction zone height, wherein the first reaction zone is configured so that a hydrocarbon cracking reaction takes place, and wherein the diameter of the first reaction zone is equal to or greater than that of the prelift zone,

c.) a second reaction zone having a second reaction zone height and a second reaction zone diameter and wherein the ratio of said second reaction zone diameter to said first reaction zone diameter is in the range of from about 1.5:1 to about 5:1, said second reaction zone is configured so that a hydrocarbon conversion reaction takes place, and

d.) an optional outlet zone having an outlet zone diameter that is reduced with respect to the second reaction zone diameter.

Claim 18 (previously presented): The riser reactor of claim 17 wherein the total height of said prelift zone, said first reaction zone, said second reaction zone, and said optional outlet zone is in the range of from about 10 meters to about 60 meters.

Claim 19 (previously presented): The riser reactor of claim 17 wherein the diameter of said prelift zone is in the range of from about 0.02 meters to about 5 meters and the prelift zone height is in the range of from about 5% to about 10% of the height of the riser reactor.

Claim 20 (previously presented): The riser reactor of claim 17 wherein the ratio of the first reaction zone diameter to said prelift zone diameter is from about 1:1 to about 2:1 and the height of said first reaction zone is from about 10% to about 30% of the height of the riser reactor.

Claim 21 (previously presented): The riser reactor of claim 17 wherein the height of said second reaction zone is in the range of from about 30% to about 60% of the height of the riser reactor.

Claim 22 (previously presented): The riser reactor of claim 17 comprising said optional outlet zone, wherein the ratio of said outlet zone diameter to said first reaction zone diameter is in the range of from about 0.8:1 to about 1.5:1 and the height of said optional outlet zone is up to about 20% of the height of the riser reactor.

Claim 23 (previously presented): The riser reactor of claim 17 further comprising a first junction section between said first reaction zone and said second reaction zone, and wherein said first junction section has a circular truncated cone shape with a vertical section vertex angle with respect to the reactor axis in the range of about 30°~80°.

Claim 24 (previously presented): The riser reactor of claim 17 comprising said optional outlet zone and further comprising a second junction section between said second reaction zone and

said outlet zone, and wherein said second junction section has a circular truncated cone shape with a vertical section vertex angle with respect to the reactor axis in the range of about 45°~85°.

Claim 25 (previously presented): A fluidized catalytic conversion process including hydrocarbon cracking reactions on hydrocarbons in a riser reactor according to claim 1, said process comprising:

a.) passing catalytic cracking catalyst and prelift medium into said prelift zone, wherein the catalytic cracking catalyst is transported to the first reaction zone without reacting a hydrocarbon in the prelift zone,

b.) passing catalytic cracking hydrocarbon feed and catalytic cracking catalyst from the prelift zone to said first reaction zone to produce a first reaction zone stream containing catalytic cracking catalyst, catalytic cracking hydrocarbon feed, and cracked hydrocarbon product,

c.) passing said first reaction zone stream from the first reaction zone to said second reaction zone to produce a second reaction zone stream containing catalytic cracking catalyst, catalytic cracking hydrocarbon feed, and cracked hydrocarbon product, and

d.) optionally passing the second reaction zone stream from the second reaction zone to said optional outlet zone.

Claim 26 (previously presented): The process of claim 25 wherein the total height of said prelift zone, said first reaction zone, said second reaction zone, and said optional outlet zone in said riser reactor is in the range of from about 10 meters to about 60 meters.

Claim 27 (previously presented): The process of claim 25 wherein the diameter of said prelift zone is in the range of from about 0.02 meters to about 5 meters and the prelift zone height is in the range of from about 5% to about 10% of the height of the riser reactor.

Claims 28-29 (canceled)

Claim 30 (previously presented): The process of claim 25 wherein said riser reactor comprises said optional outlet zone, and wherein the ratio of said outlet zone diameter to said first reaction zone diameter is in the range of from about 0.8:1 to about 1.5:1 and the height of said optional outlet zone is up to about 20% of the height of the riser reactor.

Claim 31 (previously presented): The process of claim 25 wherein said riser reactor further comprises a first junction section between said first reaction zone and said second reaction zone, and wherein said first junction section has a circular truncated cone shape with a vertical section vertex angle with respect to the reactor axis in the range of about 30°~80°.

Claim 32 (previously presented): The process of claim 25 wherein said riser reactor comprises said optional outlet zone and further comprises a second junction section between said second reaction zone and said outlet zone, and wherein said second junction section has a circular truncated cone shape with a vertical section vertex angle with respect to the reactor axis in the range of about 45°~85°.

Claim 33 (previously presented): A fluidized catalytic conversion process including hydrocarbon cracking reactions on hydrocarbons in a riser reactor according to claim 9, said process comprising:

a.) passing catalytic cracking catalyst and prelift medium into said prelift zone, wherein catalytic cracking catalyst is transported to the first reaction zone without reacting hydrocarbon in the prelift zone,

b.) passing catalytic cracking hydrocarbon feed and catalytic cracking catalyst from the prelift zone to said first reaction zone to produce a first reaction zone stream containing catalytic cracking catalyst, catalytic cracking hydrocarbon feed, and cracked hydrocarbon product,

d.) passing the first reaction zone stream from the first reaction zone to said second reaction zone to produce a second reaction zone stream containing catalytic cracking catalyst and cracked hydrocarbon product, and,

e.) optionally passing the second reaction zone stream from the second reaction zone to said optional outlet zone.

Claim 34 (previously presented): The process of claim 33 wherein the total height of said prelift zone, said first reaction zone, said second reaction zone, and said optional outlet zone in said riser reactor is in the range of from about 10 meters to about 60 meters.

Claim 35 (previously presented): The process of claim 33 wherein the diameter of said prelift zone is in the range of from about 0.02 meters to about 5 meters and the prelift zone height is in the range of from about 5% to about 10% of the height of the riser reactor.

Claims 36-37 (canceled)

Claim 38 (previously presented): The process of claim 33 wherein said riser reactor comprises said optional outlet zone, and wherein the ratio of said outlet zone diameter to said first reaction zone diameter is in the range of from about 0.8:1 to about 1.5:1 and the height of said outlet zone is up to about 20% of the height of the riser reactor.

Claim 39 (previously presented): The process of claim 33 wherein said riser reactor further comprises a first junction section between said first reaction zone and said second reaction zone, and wherein said first junction section has a circular truncated cone shape with a vertical section vertex angle with respect to the reactor axis in the range of about 30°~80°.

Claim 40 (previously presented): The process of claim 33 wherein said riser reactor further comprises said optional outlet zone and a second junction section between said second reaction zone and said outlet zone, and wherein said second junction section has a circular truncated cone shape with a vertical section vertex angle with respect to the reactor axis in the range of about 45°~85°.

Claims 41-48 (canceled)

Claim 49 (previously presented): The riser reactor of claim 1 further comprising a conduit adapted to introduce quenching medium between the first reaction zone and the second reaction zone and a source of quenching medium.

Claim 50 (previously presented): The riser reactor of claim 49 wherein the quenching medium comprises at least one medium selected from the group consisting of quenching liquids, cooled regenerated catalyst, cooled semiregenerated catalyst, fresh catalyst, and mixtures thereof.

Claim 51 (previously presented): The riser reactor of claim 49 wherein the medium comprises at least one quenching liquid selected from the group consisting of LPG, gasoline, LCO, HCO, water, and mixtures thereof.

Claim 52 (previously presented): The riser reactor of claim 49 wherein the quenching medium comprises regenerated catalyst having a residual carbon content of less than about 0.1% (wt).

Claim 53 (previously presented): The riser reactor of claim 49 wherein the quenching medium comprises semi-regenerated catalyst having a residual carbon content of at least 0.1% (wt) to about 0.9% (wt).

Claim 54 (previously presented): The riser reactor of claim 49 further comprising a conjunct zone between the first reaction zone and the second reaction zone.

Claim 55 (previously presented): The riser reactor of claim 49 comprising said optional outlet zone and further comprising a conduit adapted to introduce quenching medium between the second reaction zone and the outlet zone and a source of the quenching medium.

Claim 56 (previously presented): The riser reactor of claim 1 further comprising a conduit adapted to introduce a reactable feedstock between the first reaction zone and the second reaction zone.

Claim 57 (previously presented): The riser reactor of claim 1 further comprising a heat exchanger in the second reaction zone adapted to cool at least a portion of hydrocarbon and catalyst from the first reaction zone.

Claim 58 (previously presented): The riser reactor of claim 1 further comprising a conduit adapted to introduce fresh catalyst between the first reaction zone and the second reaction zone and a source of the fresh catalyst.